

# Power Up Skills with Power BI

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Blog: <a href="https://datavibe.co.uk/">https://datavibe.co.uk/</a>









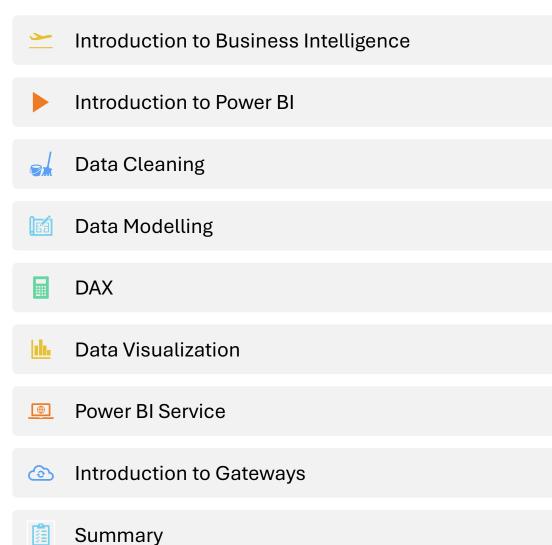
## Ground Rules for the Training day

- Phones on silent or buzz is really appreciated
- Raising hand for any questions

**HAVE FUN LEARNING!!!** 







### Scan Me to Get Started













What is Business Intelligence





Business Intelligence Evolution



What is Power BI



Comparison with Excel

#### What is Business Intelligence?



- Business intelligence (BI) leverages software and services to transform data into actionable insights that inform an organization's strategic and tactical business decisions.
- BI tools access and analyse data sets and present analytical findings in reports, summaries, dashboards, graphs, charts and maps to provide users with detailed intelligence about the state of the business.
- Also refers to a range of tools that provide quick, easy-to-digest access to insights about an organization's current state, based on available data.

#### Business Intelligence Evolution





#### What is Power BI?





Power BI is a collection of software services, apps, and connectors that work together to turn your unrelated sources of data into coherent, visually immersive, and interactive insights.

#### What is Power BI?

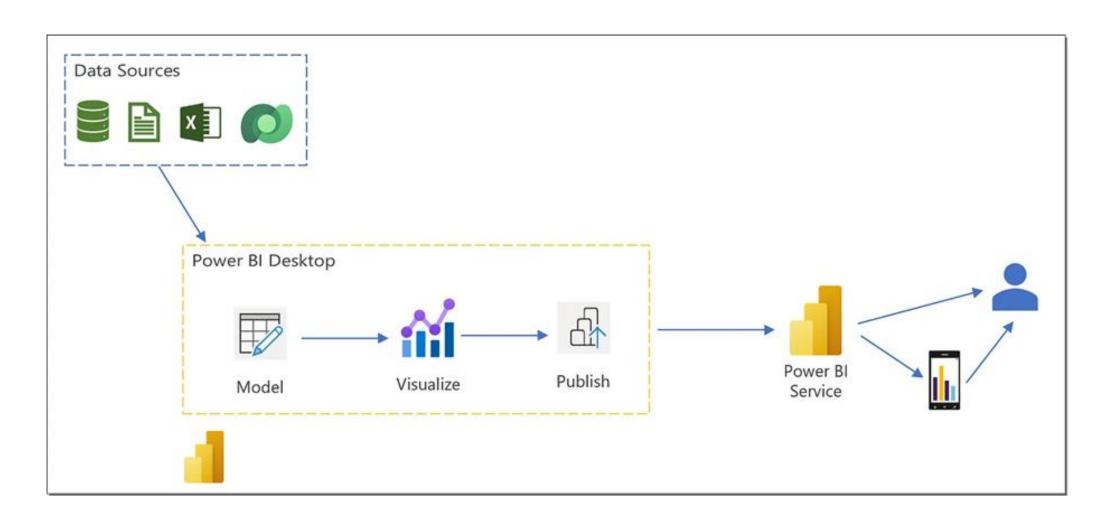


- Self-service BI tool that allows:
  - Connectivity to hundreds of data sources
  - User friendly and easy data preparation, analysis and presentation.
  - Create professional looking reports and the possibility of sharing with the organization's stakeholders



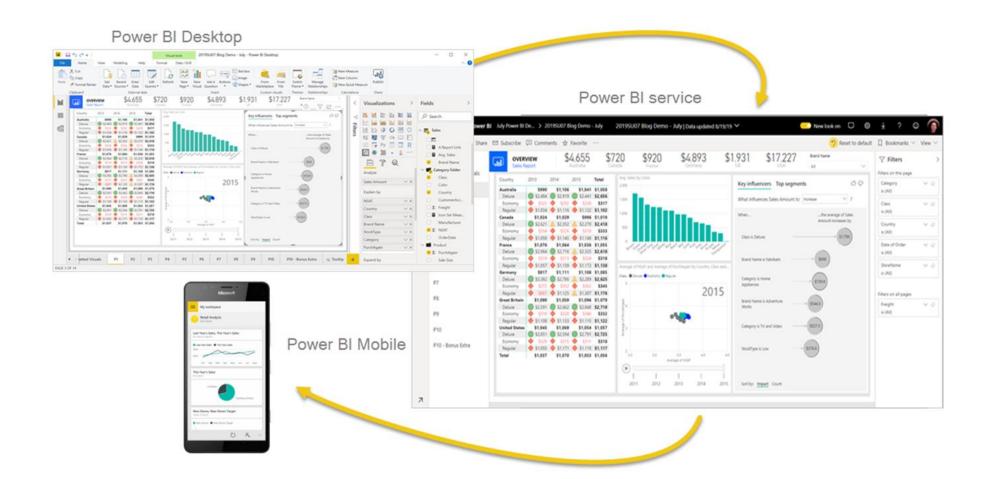
#### **Power BI**





#### **Power BI Eco-System**





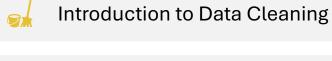
#### What is different from Excel

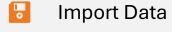


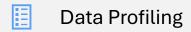
	x	
Easy to learn		
Chart Selections		
Chart Customizations		
Interactivity		
Flexible Analytics		
Sharing		
Data Size		
Data Sources		
Automatic Refresh		
Accessible		
Cost		

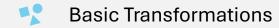


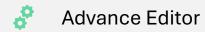












Customs Columns

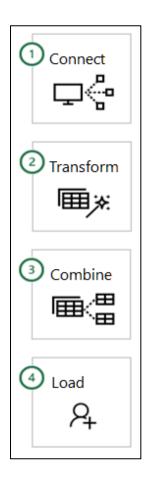
Best Practices

Quiz

# Data Cleaning

#### **Data Cleaning: Power Query**





#### Allows:

- Import or connect to external data
- Shape the data
- Load the query into Power BI (Excel) to create charts and reports.
- Refresh of the data to have the information up to date.

#### **Transformations:**

- Remove columns
- Change data types
- Merge tables
- ...

#### Availability:

- Power BI Desktop
- Power BI Service
- Excel (App and Online)

#### **Import Data**



#### Files

- Excel
- Text/CSV
- XML
- JSON
- Sharepoint
- ...

#### Database

- SQL Server
- Access
- Oracle
- Google Big Query
- ...

#### Fabric / Power Platform

- Power BI Dataset
- Dataverse
- Dataflows
- Fabric (Datamarts, Lakehouses, Warehouses)
- ...

#### Azure

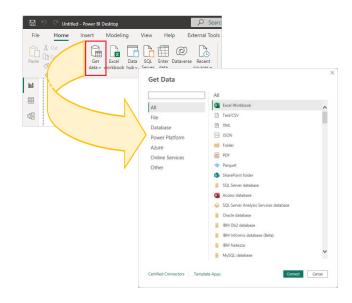
- Azure SQL Database
- Azure SQL Data WH
- Azure Blob Storage
- Axure Table Storage
- Azure Databricks
- ...

#### Online Services

- Dynamics 365
- Salesforce Objects
- Facebook
- GitHub
- ..

#### Other

- Web
- Active Directory
- Microsoft Exchange
- OData Feed
- Spark
- ...

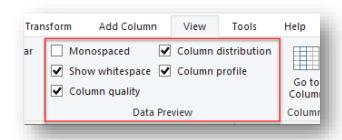


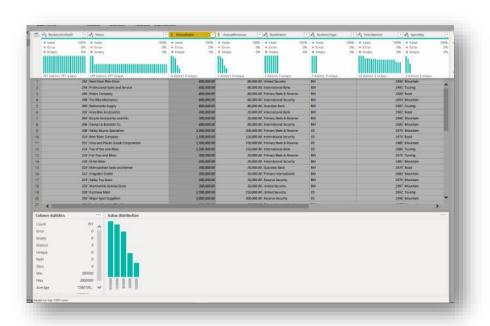
#### **Data Profiling**



Provide new and intuitive ways to clean, transform, and understand data in Power Query Editor.

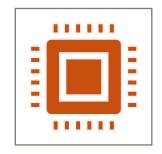
- Column quality (5 values):
  - Valid
  - Error
  - Empty
  - Unknow
  - Unexpected Error
- Column distribution:
  - Frequency
  - Distribution of the values
- Column profile:
  - Statistics chart





#### **Basic Transformations**

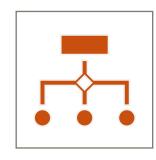




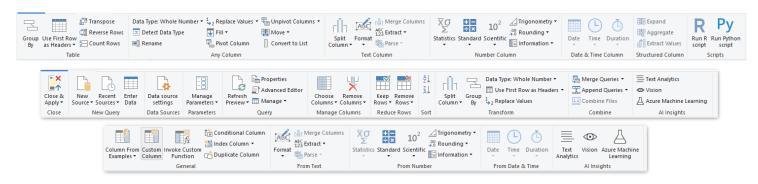
The transformation engine in Power Query includes many prebuilt transformation functions that can be used through the graphical interface of the Power Query Editor.



These transformations can be as simple as removing a column or filtering rows, or as common as using the first row as a table header. There are also advanced transformation options such as merge, append, group by, pivot, and unpivot.



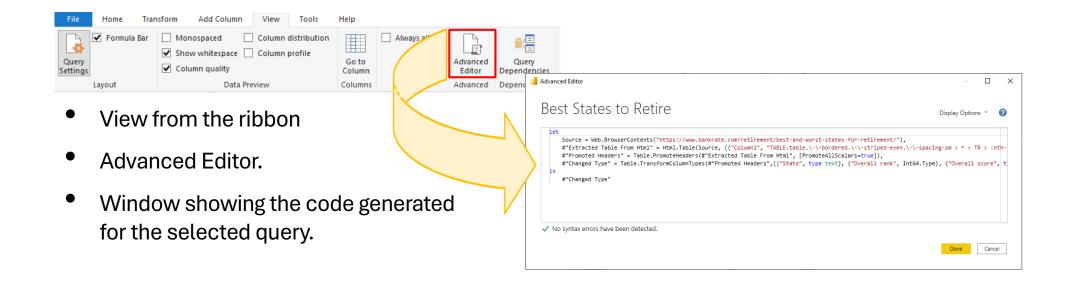
All these transformations are made possible by choosing the transformation option in the menu, and then applying the options required for that transformation. The following illustration shows a few of the transformations available in Power Query Editor.



#### **Advance Editor**



Let's see the code that Power Query Editor is creating with each step. It also lets you create your own code in the Power Query M formula language.



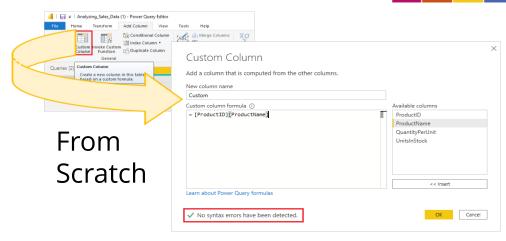
#### **Custom Columns**

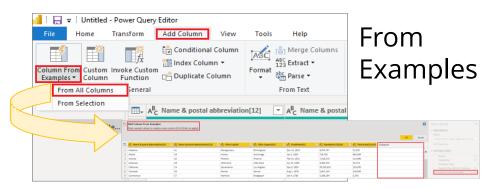
IPBIG
POWER BI GEBRUIKERSGROEP

A custom column can be added to the model using PowerQuery Editor.

With Power Query Editor, you can create and rename your custom column to create PowerQuery M formula queries to define your custom column.

PowerQuery M formula queries have a comprehensive function reference content set.





#### **Best Practices**



- Rename steps (easy identification)
  - Advantage: Avoid the repetition that occurs with auto naming
  - How: Select step to rename: right click and rename, double click step or press F2
- Avoid spaces, replace by Upper letters or \_
  - Advantage: Facilitates Intelissense and/or Advance Editor coding
  - Example: Format\_Delivery\_Date or FormatDeliveryDate
- Look for repetition of steps
  - Advantages: Avoid duplication of names
    - Reduce number of steps
- Define datatype for all columns
  - Advantage: Avoid issues when loading the query
  - How: View column header for icon ABC/123 43 or Home tab Data Type equals Any
- Datatypes transformation in the last step and only once
  - Turn off the Type detection on the Options of Power BI desktop
  - Detect datatype is standard based on the top 1000 rows





# Data Cleaning Quiz





## Data Modelling

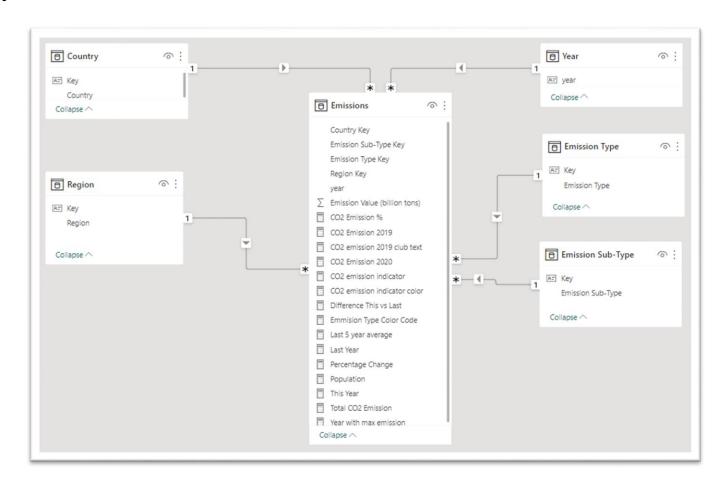
- Introduction to Data Model
- ★ Star Schemas
- **Create Date Tables**
- Relationships & Cardinalities
- Dimensions & Hierarchies
- **†|•** Role Playing Dimensions
- Data Model Optimization
- Modelling View
- Pest Practices
- Quiz

#### Introduction to Data Modelling



#### Benefits of a good data model:

- Accurate reports.
- Faster data exploration.
- Simpler aggregations.
- Easier to maintain.



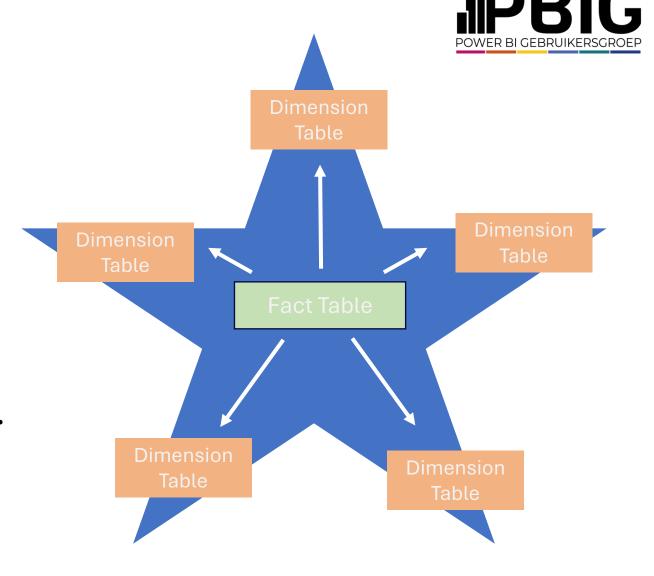
#### **Star Schema**

Dimension:

Describes business entities.

• Fact:

Stores observations or events.



#### **Calendar Table**



#### Importance of a Date Table:

- Makes it simple to organize and analyse data by date
- Slice and dice your data by date attributes such as weekday, month, quarter, and year

#### How to create:

- The Auto date/time option
- Power Query to connect to a date dimension table
- Power Query to generate a date table (<u>Chris Webb's BI Blog, Radacad</u>)
- DAX to generate a date table (SQLBI, Radacad)
- DAX to clone an existing date table

#### Requirements:

- It must have a column of data type date (or date/time)—known as the date column.
- The date column must contain unique values.
- The date column must not contain BLANKs.
- The date column must not have any missing dates.
- The date column must span full years. A year isn't necessarily a calendar year (January-December).
- The date table must be marked as a date table.



# Standardize On Date Formats And Ranges That Meet Company Requirements.

Date -	Year 🔻	MonthNum 💌	WeekNum 🔻	DayoftheWeek <b>T</b>
Tuesday, May 31, 2011	2011	5	23	Tuesday
Wednesday, June 1, 2011	2011	6	23	Sunday
Thursday, June 2, 2011	2011	6	23	Monday
Friday, June 3, 2011	2011	6	23	Tuesday

#### Relationship & Cardinalities



- **Relationship**: Formed by correlating rows belonging to different tables.
- Cardinality: Uniqueness of data values in a column.



#### Introduction to Dimension & Hierarchies



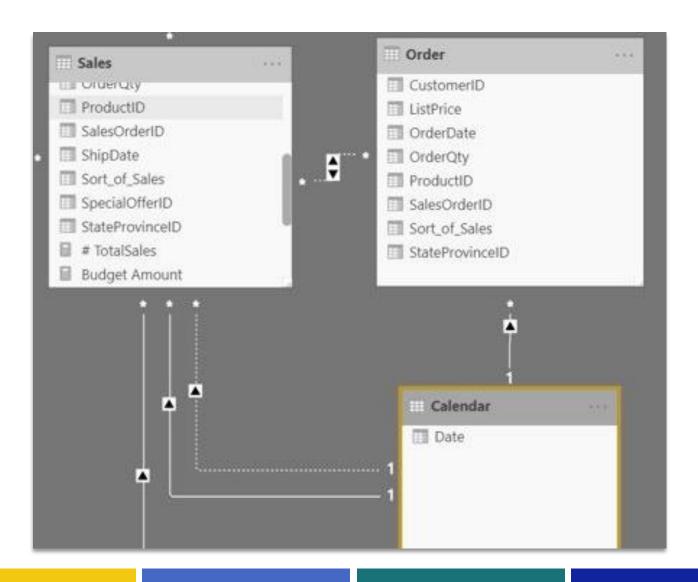
- Dimension: Store details about business entities.
- Hierarchy: Organize data such that one element is ranged over other data.

Key 💌	Region <b>T</b>
1	Latin America & Caribbean
2	South Asia
3	Sub-Saharan Africa
4	Europe & Central Asia
5	Middle East & North Africa
6	East Asia & Pacific
7	North America

#### **Role Playing Dimension**



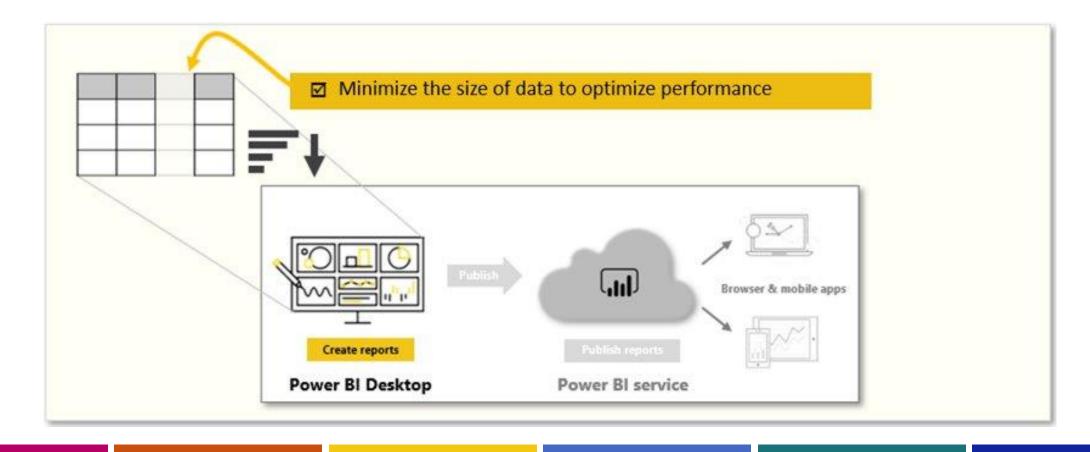
A dimension that can filter related facts differently.



#### **Data Model Optimization**



When your data model is optimized, it performs better.



#### **Data Model Best Practices**



- Bring only what you need the right columns
- Be cautious about the format of the columns date, number, etc.
- See if you can follow the Star Schema approach
- Turn-off auto-date time
- Make sure to check your relationships (auto-detect !!!)
- Avoid Many-Many relationship. Use Bridge Tables!
- Clean your data on the data-source side. Let's try to avoid burden on Power BI side





# Data Modeling Quiz







Measures vs columns



**Quick Measures** 



**Basic DAX Functions** 



Quiz

### DAX

#### **DAX**



Data Analysis Expressions (DAX) is a formula expression language used in Analysis Services, Power BI, and Power Pivot in Excel.

DAX formulas include functions, operators, and values to perform advanced calculations and queries on data in related tables and columns in tabular data models.

DAX formulas are used in measures, calculated columns, calculated tables, and row-level security.

#### Measures vs Columns



Measures and calculated columns both use DAX expressions.

Difference: context of evaluation.

Measures: evaluated in the context of the cell evaluated in a report or in a DAX query

SUM(Sales[SalesAmount]) = sum of all the cells that are aggregated under this cell.

Columns: computed at the row level within the table it belongs to.

Sales[SalesAmount] =value of the SalesAmount column in the current row.

The context of the cell depends on user selections in the report or on the shape of the DAX query.

#### Quick Measures



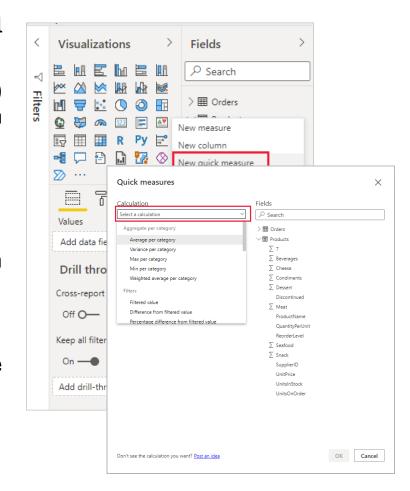
Quick measures: quickly and easily perform common, powerful calculations.

Quick measure runs a set of Data Analysis Expressions (DAX) commands behind the scenes, then presents the results to use in a report.

No need to write the DAX. Done based on input provided.

Several categories of calculations and ways to modify each calculation.

The DAX can be immediately seen and jump-start or expand the user DAX knowledge.



#### **Categories of Quick Measures**



- Aggregate per category
  - Average per category
  - Variance per category
  - Max per category
  - Min per category
  - Weighted average per category
- Filters
  - Filtered value
  - Difference from filtered value
  - Percentage difference from filtered value
  - Sales from new customers
- Time intelligence
  - · Year-to-date total
  - Quarter-to-date total
  - Month-to-date total
  - Year-over-year change
  - Quarter-over-quarter change
  - Month-over-month change
  - Rolling average

- Totals
  - Running total
  - Total for category (filters applied)
  - Total for category (filters not applied)
- Mathematical operations
  - Addition
  - Subtraction
  - Multiplication
  - Division
  - Percentage difference
  - Correlation coefficient
- Text
  - Star rating
  - Concatenated list of values

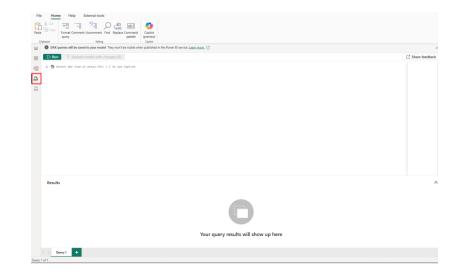
#### **DAX Query View**



View and work with Data Analysis Expressions (DAX) queries in semantic models.

DAX queries are similar to SQL queries in that they can show you data you already have. DAX queries don't create items in the model or visuals in the report.

- An EVALUATE statement, which is required. It specifies what and how data is returned in the query.
- A DEFINE statement, which is optional. It allows you to define DAX formulas, such as a measure, to use in the query. Measures created or updated using the DAX query DEFINE MEASURE are DAX query scoped measures, running only in the context of the DAX query. DAX query scoped measures can be added to the model using CodeLens update model actions or Update model with changes button.



#### **TMDL View**

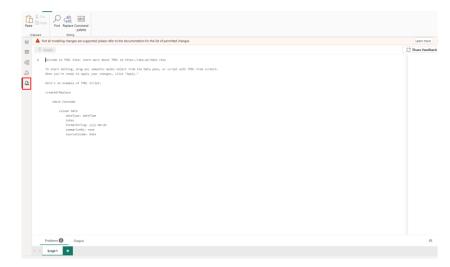


TMDL view lets you script, modify, and apply changes to semantic model objects with a modern code editor using Tabular Model Definition Language (TMDL) in Power BI Desktop.

TMDL view offers an alternative experience to semantic modelling using code, instead of a graphical user interface such as Model view.

TMDL view offers the following advantages:

- Enhanced development efficiency with a rich code editor that includes search-and-replace, keyboard shortcuts, multi-line edits and more.
- Increase reusability by easily scripting, sharing, and reusing TMDL scripts among semantic model developers.
- Gain more control and transparency, showing all semantic model objects and properties, and allowing changes to items not available in the Power BI Desktop user interface.



#### **DAX Basic Functions**



#### **Aggregate Functions**

- MIN
- MAX
- Average
- SUM
- SUMX
- Counting Functions
- DISTINCTCOUNT
- COUNT
- COUNTA
- COUNTROWS
- COUNTBLANK

#### **Logical Functions**

- AND
- OR
- NOT
- IF
- IFERROR

#### **TEXT Functions**

- REPLACE
- SEARCH
- UPPER
- FIXED
- CONCATENATE

#### **DATE Functions**

- DATE
- HOUR
- WEEKDAY
- NOW
- EOMONTH

#### **INFORMATION Functions**

- ISBLANK
- ISNUMBER
- ISTEXT
- ISNONTEXT
- ISERROR





### DAX Quiz





#### Data Visualizations

- Page canvas, background & settings
- Visuals in Power BI (show new visuals added)
- Customs Visuals
- Visual Calculations
- What Visuals to use when
- Analytics feature in visuals
- Conditional formatting
- Buttons/bookmarks
- Torill down, drill up & drill troughs
- Themes
- Brand specific custom theme
- + Performance Analyzer
- Best Practices
- Quiz

#### Introduction to Data Visualizations



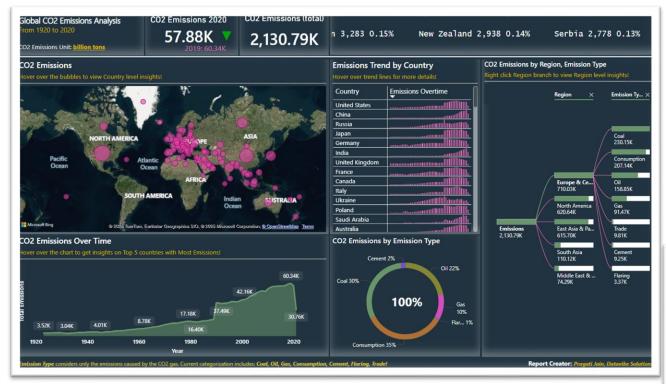




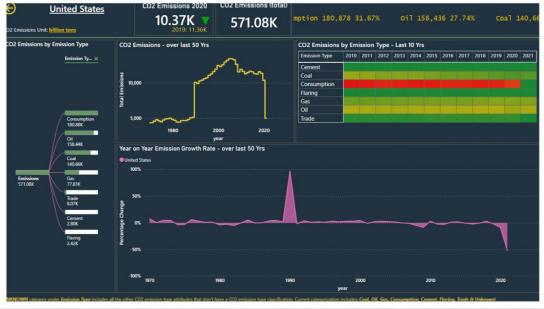
Visuals allow you to share data insights more effectively

Effective visualizations help your users connect and interact with the information.

#### Design a Report Layout



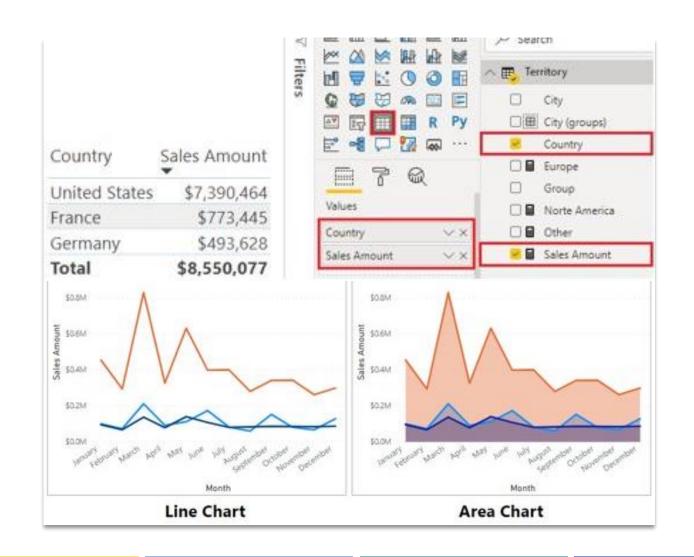




#### **Choosing Effective Visualizations**

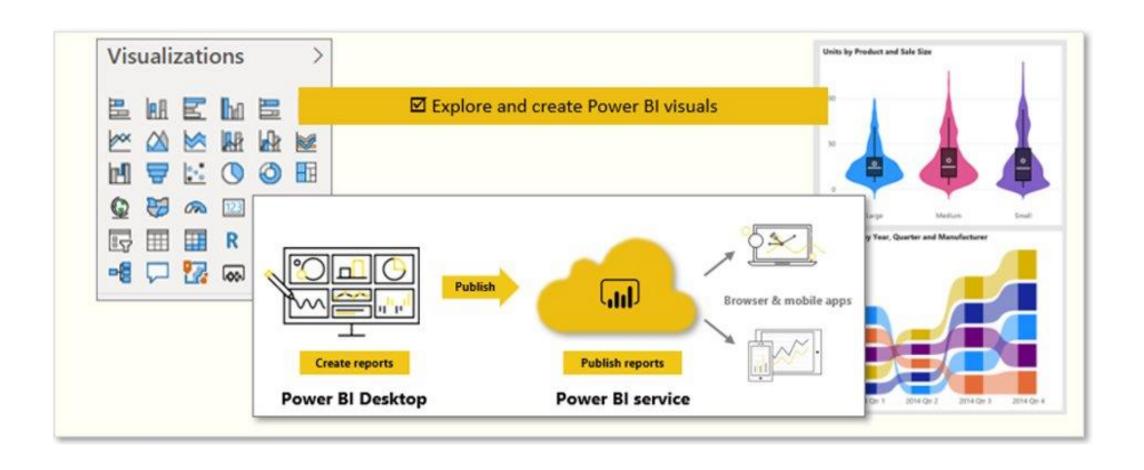


The Right Visual Makes All The difference.



#### Adding Visualizations to Reports

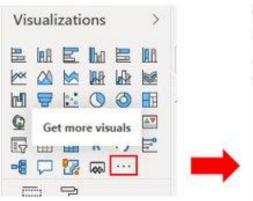


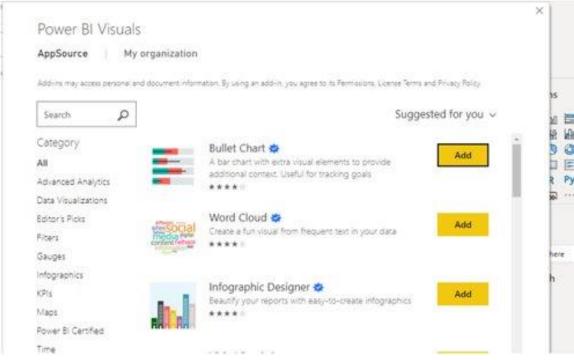


#### Import a Custom Visual



Use visuals tailored for your needs.



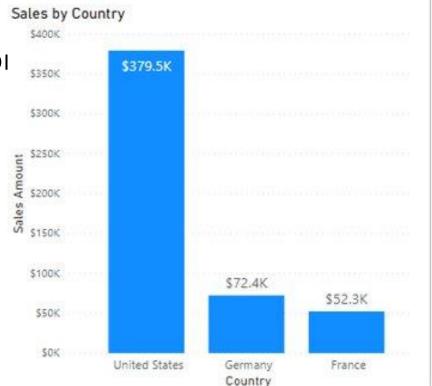


#### Format & Configure Visualizations



 Control the look and feel of each visual.

 Format options differ depending or the type of visual selected.

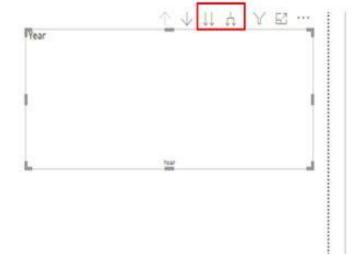




#### **Basic Interactions**



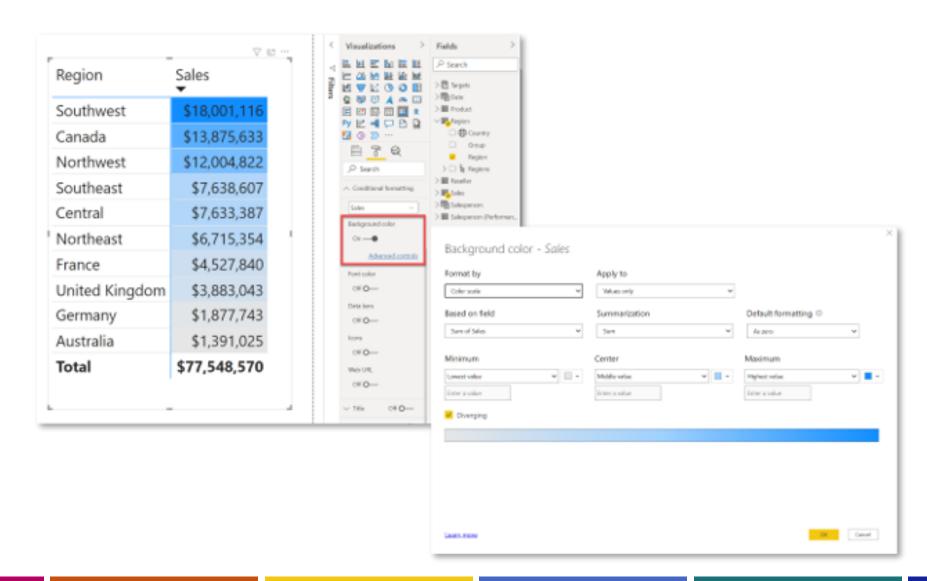
- •Use interactions to change how visuals impact each other.
- •Use hierarchies to drill down for additional relevant content.





#### Configure Conditional formatting

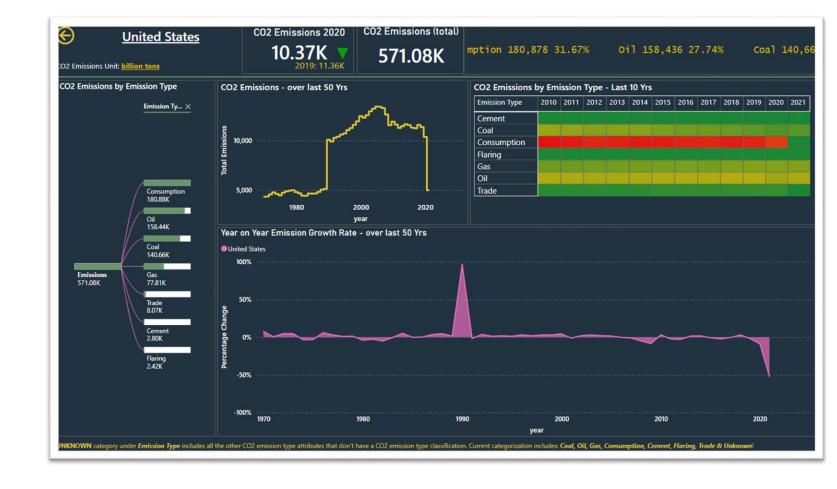


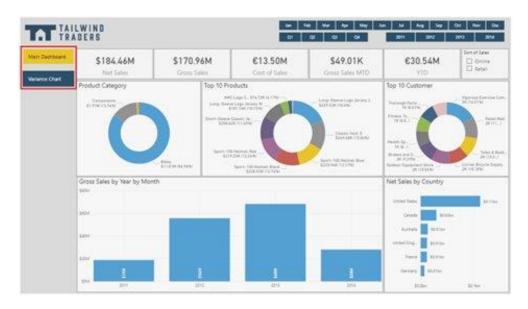


#### **Design Report Navigation**



- Move users between pages.
- Use buttons, bookmarks, or conditional formatting.

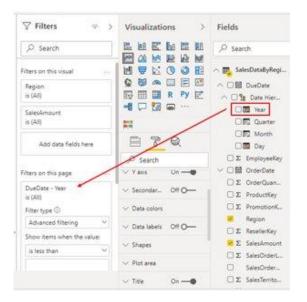




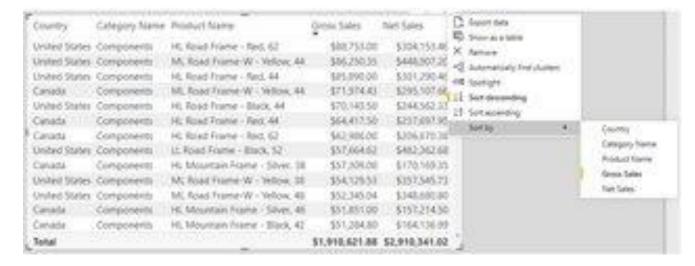




### Adding Buttons, Bookmarks & Selections

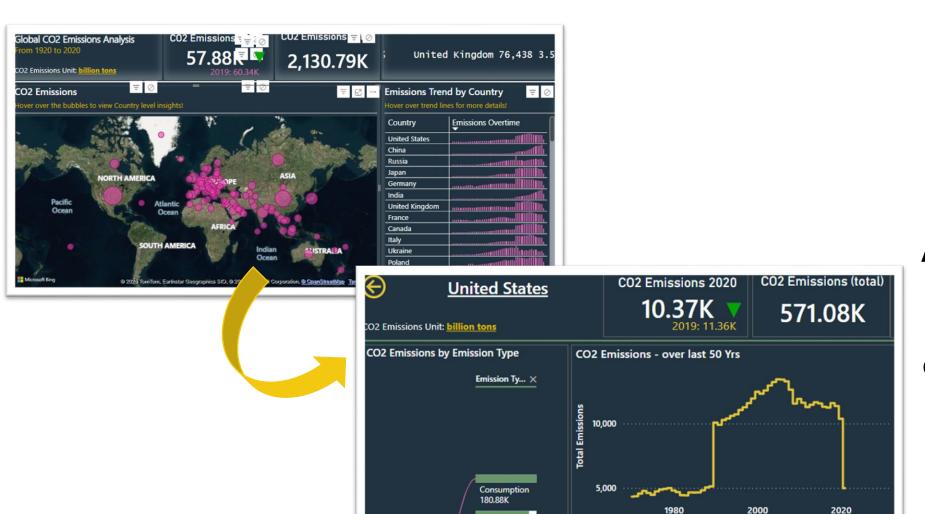








# Apply Slicing, Filtering, Sorting





#### Advanced Interactions & Drillthroughs



### **Key Performance Indicators**



AN EXCELLENT SOURCE IN HELPING TRACK TOWARD A SPECIFIC GOAL OVER TIME.



BEST WHEN USED IN A SERIES (E.G., DAILY, MONTHLY, ETC.).

TotalSales and Goal by Month

6.67M~ Goal: \$595,092 (+1020.18%)

TotalSales and Goal by FiscalYear

45.18M~

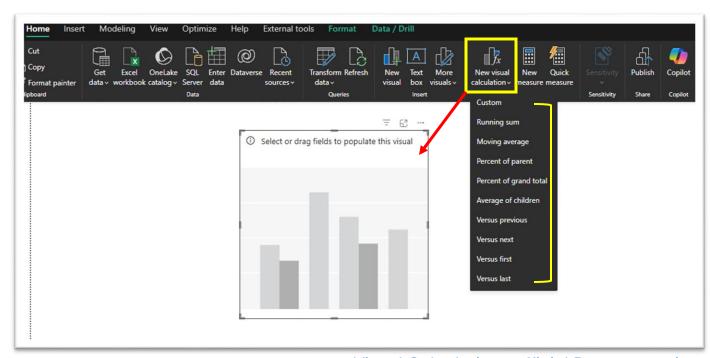
TotalUnits and Last Year Sales ....





#### Visual Calculations

- It is a DAX calculation that is defined and executed directly on a visual
- Scope is at visual level
- Don't exist in Semantic model, exist in a visual
- Visual Calculations are under Preview.



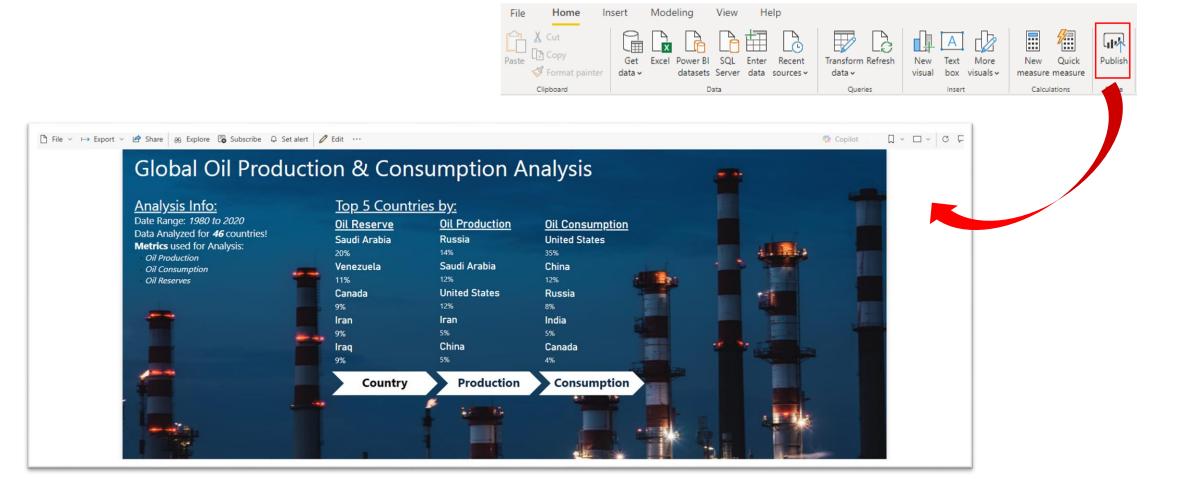


#### Visual Calculations Limitations

- Not all visuals support visual calculations.
- Custom visuals are not tested with visual calculations.
- Can't filter on visual calculations.
- Copy/paste doesn't work for these calculations.
- Publish to web can't be used with visual calculations.
- Field parameters have limitations when used with visual calculations.
- Full list on limitations can be found <u>here</u>.



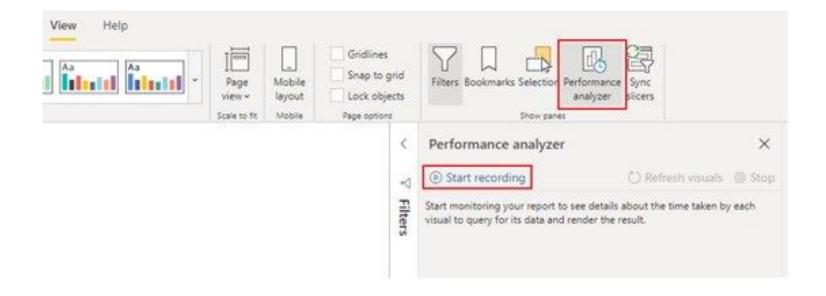
#### **Publish & Export Reports**



#### Performance Analyzer



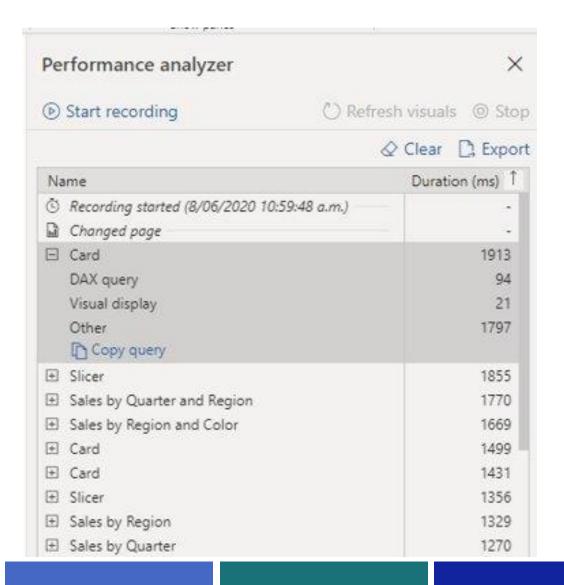
- Find out how each report element is performing.
- Measure report elements during user interaction.
- Detect which aspects are least or most resource intensive.



#### **Review Performance Results**



- Log information shows duration to complete each task.
- Duration value indicates the difference between the start and end timestamp for each operation.



#### Data Visualization Best Practices



- Less is More! Think about the number of visuals on the page/tab
- Keep it simple use the right visuals to represent the right information
- Make sure to use the right themes/colours standard colours make a very big difference
- Look for Accessibility friendly colours
- Try to tell a story with the visuals
- Use conditional formatting, icons, where relevant
- Think before adding Pie-charts/Donut-charts to your report





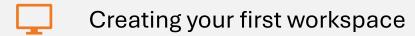
## Data Visualization Quiz

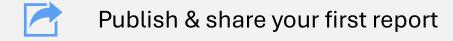




#### Power BI Service







Creating a Dashboard from a report

Quiz

#### Introduction to Workspaces





A centralized repository to:

Collaborate with colleagues and teams.

Create collections of reports and dashboards.



Workspaces provide the following benefits:

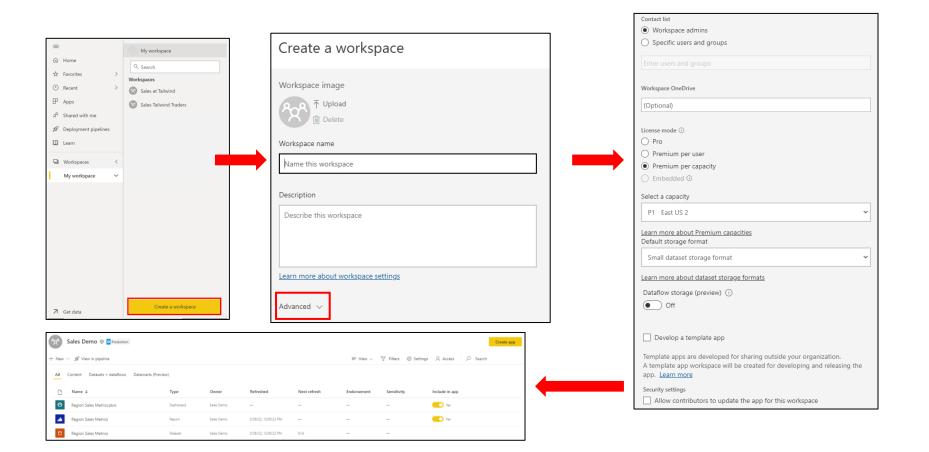
Share and present reports in a single environment.

Enable the highest level of security.

An environment for housing reports and dashboards for use by others.

#### **Create a Workspace**



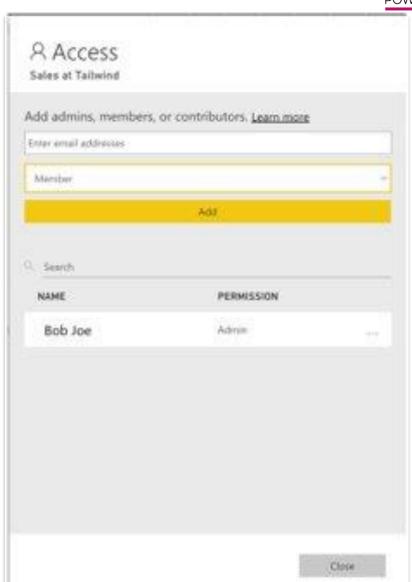




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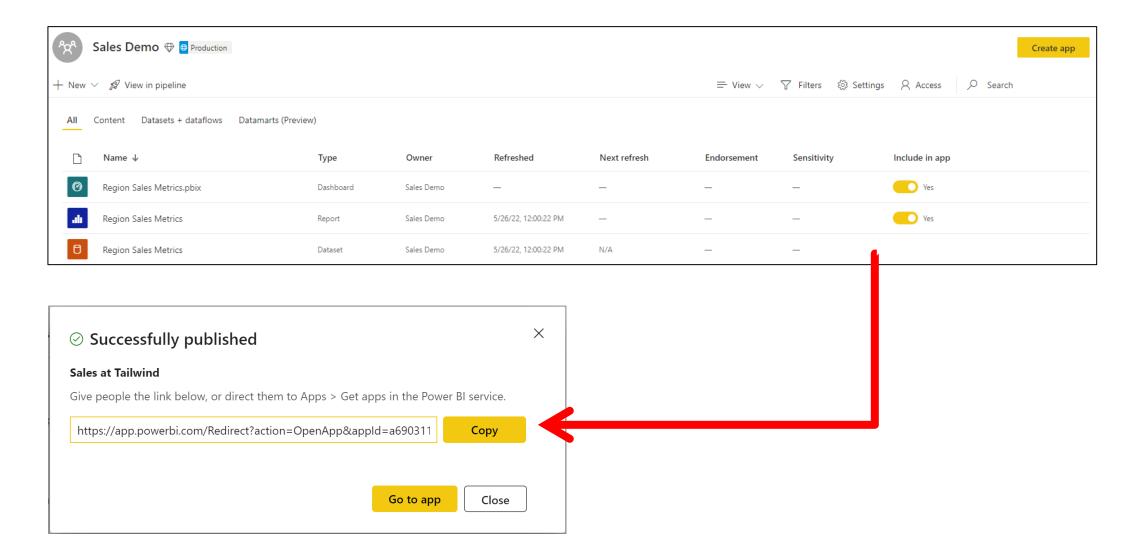
- Roles determine what a user can do in a workspace, so teams can collaborate.
- Key roles include:
  - Admin.
  - Member.
  - Contributor.
  - Viewer.

More Info Here



#### **Create Apps**

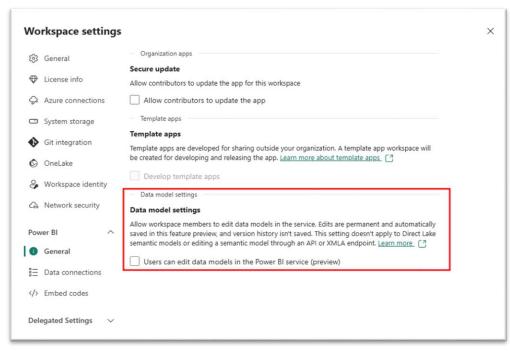


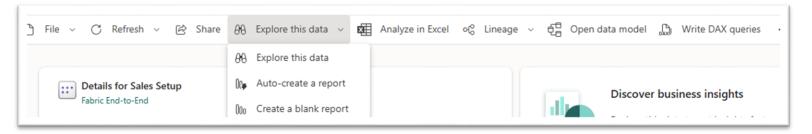


#### **New options**



- Edit Semantic Models in the service
   Set by workspace All functionalities that are available in desktop
- Write DAX Queries
- Auto create report









## Power BI Service Quiz





### Introduction to Gateways



Installing personal gateway



Configuring gateways in Power BI Service



Quiz

#### **Power BI gateway?**

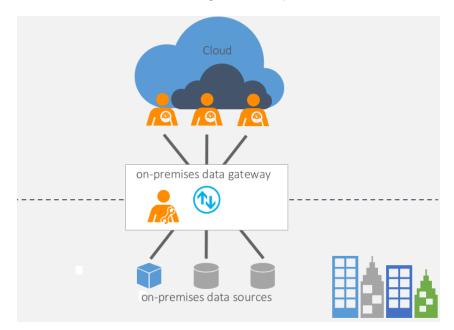


The on-premises data gateway acts as a bridge. It provides quick and secure data transfer between on-premises data, which is data that isn't in the cloud, and several Microsoft cloud services. These services include Power BI, Power Apps, Power Automate, Azure Analysis Services, and Azure Logic Apps.

By using a gateway, organizations can keep databases and other data sources on their onpremises networks while securely using that onpremises data in cloud services.

#### Types of Gateways:

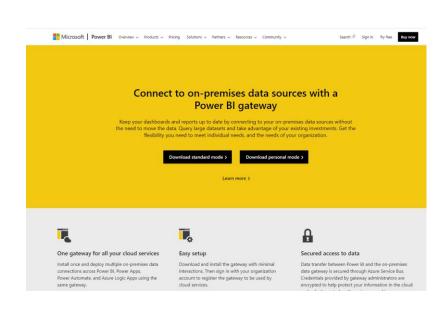
- On-premises data gateway
- On-premises data gateway (personal mode)

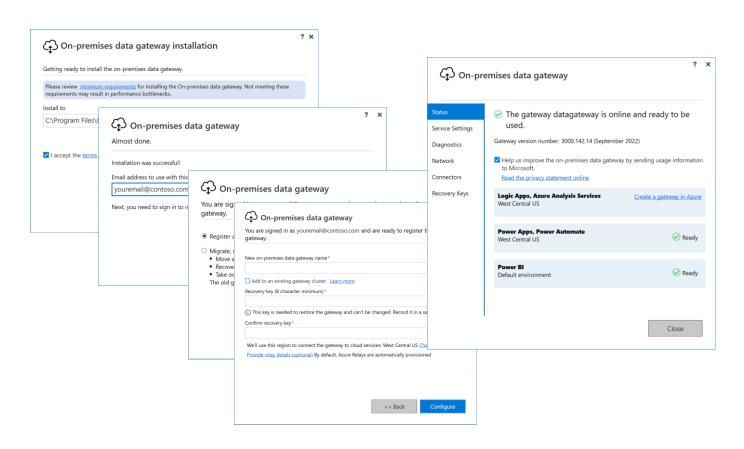


#### Install a personal gateway



- Download the installation package <a href="https://powerbi.microsoft.com/en-us/gateway/">https://powerbi.microsoft.com/en-us/gateway/</a>
- Follow the installer options









## Introduction to Gateways Quiz

#### Do you want some Tips?



- Start small grow big
- On building a model think of the now not the future
- Always remind of automation, repletion and scalability
- Try to tell a story with your data
- Take advantage of online resources
  - Documentation
  - Community
  - YouTube
  - LinkedIn



#### Summary





- Introduction to Business Intelligence
- Introduction to Power BI
- Data Cleaning
- Data Modelling
- DAX
- Data Visualization PBI report from scratch
- Power BI Service
- Introduction to Gateways

#### A big thank you to our amazing partners



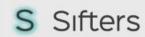


































































#### Session Feedback



#### **Event Feedback**

